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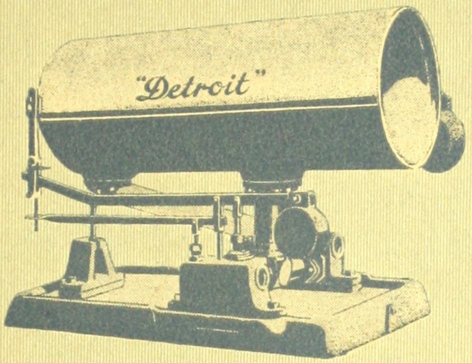

WATCH YOUR CONDENSATION

system

"WATCH YOUR CONDENSATION"

A Book on the Simplicity, Reliability
and Economy of the "A. B. C. Detroit"
Systems for Handling Condensation

American Blower Company
Detroit, Michigan • Branch Offices in Principal Cities

No. 1319 Superseding No. 19, Series 11 Copyright, 1924

"A. B. C. Detroit" Systems—
Ten Points of Exceptional Value

1. They increase the heating circulation.
2. They increase the heating surface.
3. They increase the engine horse-power.
4. They increase the boiler horse-power.
5. They increase the heater capacity.
6. They decrease the coal bill.
7. They decrease the water bill.
8. They decrease the initial cost.
9. They decrease the yearly maintenance.
10. They decrease the general troubles.

"A. B. C. Detroit" Systems

Are especially constructed and applied to the handling of condensation in the following:

1. Tanneries.
2. Salt Plants.
3. Potteries.
4. Office and Public Buildings.
5. Textile Mills.
6. Government and State Buildings.
7. Tobacco Plants.
8. Soap Factories.
9. Ships and Ship Yards.
10. Leather Manufactories.
11. Iron and Steel Plants.
12. Greenhouses.
13. Hotels, Hospitals, Apartments.
14. Sugar Refineries.
15. Wood-working Plants.
16. Dry Kilns.
17. Power Houses.
18. Water and Gas Works.
19. Cement Factories.
20. Mining Plants.
21. Pulp and Paper Mills.
22. Packing Houses.
23. Laundries and Dye Houses.
24. Wire, Tin Plate and Rolling Mills.
25. Ice Plants.
26. Creameries.

"WATCH YOUR CONDENSATION."

IMPORTANT NOTICE

"A. B. C. Detroit" Traps are manufactured under the following U. S. Letters Patent:

Numbered 848,684—Dated April 2, 1907.
Numbered 848,685—Dated April 2, 1907.
Numbered 883,825—Dated April 7, 1908.
Numbered 883,826—Dated April 7, 1908.
Numbered 988,385—Dated April 4, 1911.
Numbered 1,000,344—Dated Aug. 8, 1911.

Purchasers are guaranteed full protection in the matter of alleged patent infringement.

AMERICAN BLOWER COMPANY
DETROIT, MICH.
U. S. A.

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Complete Briefed Directory to the Contents of this Book, which Proves the "A. B. C. Detroit" Systems for Handling Condensation to be the most Simple, Reliable and Economical.

SIMPLICITY OF THE SYSTEM PAGE 5

The handling of Condensation has been very sadly neglected, but those who are awake and looking to cut their overhead or to increase their boiler, engine or heater capacity or bring up the efficiency of their Heating, Drying or Cooking Systems, are asking—"Is there not some Reliable, Efficient, Simple and Mechanically Correct method by which we can return this Hot Condensation directly to our boiler? Why at this stage of the world can this work not be automatic?"

A TECHNICAL DESCRIPTION PAGE 6

This is a description of the working of the "Detroit" Trap.

DIRECT RETURN SYSTEM

The Direct Return Systems are used to automatically return the Condensation directly to the boiler without the loss of any of its heat units, also to remove the air. There are three Direct Return Systems.

THE "A. B. C. DETROIT" SINGLE SYSTEM PAGES 7 TO 8

The "Detroit" Single System is installed when there is high pressure to deal with.

THE "A. B. C. DETROIT" DOUBLE SYSTEM PAGES 9 TO 10

The "Detroit" Double System is used when there is low pressure to handle.

THE "A. B. C. DETROIT" COMBINATION SYSTEM PAGE 11

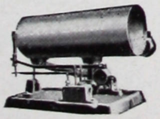
The "Detroit" Combination System is installed when there are variable pressures, such as exhaust at one time and a much higher pressure at other times.

THE "A. B. C. DETROIT" METERING SYSTEM PAGE 11

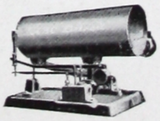
The installation of the "Detroit" Metering System is desirable when it is necessary to weigh the water under all temperatures.

THE "A. B. C. DETROIT" BOILER FEED SYSTEM PAGE 12

This is a variation in the application of the Direct Return Double System, feeding the boiler all its water from the heater.



"A. B. C. Detroit" Systems for handling condensation increase the heating circulation.



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This system is used when vacuum lines or vacuum oil separators are to be drained.

THE "A. B. C. DETROIT" VACUUM SYSTEM — PAGES 13 TO 15

This system is installed when it is necessary to form a vacuum on the drained end of a heating system to increase the circulation.

THE "A. B. C. DETROIT" LIFTING SYSTEM — PAGE 15

This system is installed when it is necessary to handle water from a low point or from a distance.

THE "A. B. C. DETROIT" PUMPING SYSTEM — PAGE 15

The Pumping System is applied where the water is to be taken from a well and delivered to a tank or heater.

LOW PRESSURE HEATING—THE "A. B. C. DETROIT" ELECTRIC PUMP UNIT SYSTEM — PAGES 16 TO 17

Where the radiation is below the water line of the boiler, the heating system requires a "Detroit" Electric Pump Unit. The Unit is placed below the lowest point of radiation. The condensation flows to it by gravity.

LOW PRESSURE HEATING—THE "A. B. C. DETROIT" OPEN END RETURN SYSTEM — PAGE 17

Where the radiation is above the water line of the boiler, the "Detroit" Open End Return System is used. A "Detroit" Trap is placed between the radiation and the boiler water line.

LOW PRESSURE HEATING—THE "A. B. C. DETROIT" VACUUM SYSTEM — PAGE 17

An installation of this nature has always fallen to the lot of a Vacuum Pump. In order, however, to get away from the troubles of this method, engineers are asking for the "Detroit" Vacuum System.

"A. B. C. DETROIT" SEPARATING TRAPS — PAGE 18

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GENERAL INSTRUCTIONS — PAGE 20

ILLUSTRATIONS OF ACTUAL INSTALLATIONS — PAGES 21 TO 24

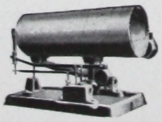
Illustrations of actual installations are always interesting. In some of the instances shown the traps have actually paid for themselves many times over, during the first year of their operation.

LINE AND TECHNICAL DRAWINGS — PAGES 25 TO 30

This is a special section devoted entirely to showing the technical line drawings and engineers' references regarding the "Detroit" Systems, with capacities.

HANDY INFORMATION — PAGES 31 TO 32

This is a section devoted to tables on pressures and other technical data of importance.



"A. B. C. Detroit" Systems for handling condensation increase the heating surface.

Simplicity of the "A. B. C. Detroit" System

It is easy enough for us to state the fact that the "Detroit" Systems have the advantage over all other methods of handling condensation. And that they are also simpler and more reliable than other systems.

It is the purpose of this book to prove these facts to you to your own satisfaction.

It is more than likely that for most of us the book facts and statistics on this question of handling condensation have slipped from our minds. Let us, therefore, refer again to the first principles, or rather the definition of them.

The term *Steam Trap* as applied popularly to this question of handling condensation is a misnomer, yet it is true that trapping steam is one of the great items.

The "Detroit" Return Systems not only trap the condensed steam or worn-out steam but see to it that this condensation is again revived and turned into live steam with the smallest possible loss of power or heat units.

Webster's Dictionary does not define a steam trap. The definitions of the two words, however, are as follows: "Steam" is a vapor into which water is changed when heated to the boiling point. "Trap" is an instrument shutting suddenly for snaring or trapping.

We all know that the boiling point of water is 212 degrees Fahrenheit at atmosphere.

A mere steam trap then would be a device for snaring or trapping vapor into which water is changed when heated to 212 degrees Fahrenheit. Now the "Detroit" Return Systems not only capture the condensed steam but, as we said before, see that this worn-out steam is revived and turned again into live steam with as small a loss of power as possible.

The "Detroit" Return Systems for handling condensation are the simplest and most economical for doing this work.

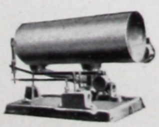
This is not a mere advertising statement. It is not a mere matter of passing fact.

It is a claim which can be proven to you by statistics as well as by the records of actual performance.

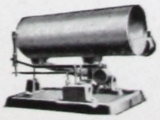
Consider this thing again in the light of the claim we have just made. You who are interested in this book and the subject on which it treats are more or less familiar with the various methods which have been introduced for handling condensation.

It isn't, therefore, necessary to dwell on the unusual importance of the claim made for the "Detroit" Systems.

This book will prove to you that the "Detroit" Systems are the simplest and most economical methods in the World for handling condensation.



"A. B. C. Detroit" Systems for handling condensation increase the engine horse power.



"A. B. C. Detroit" Return Trap—Technical Description

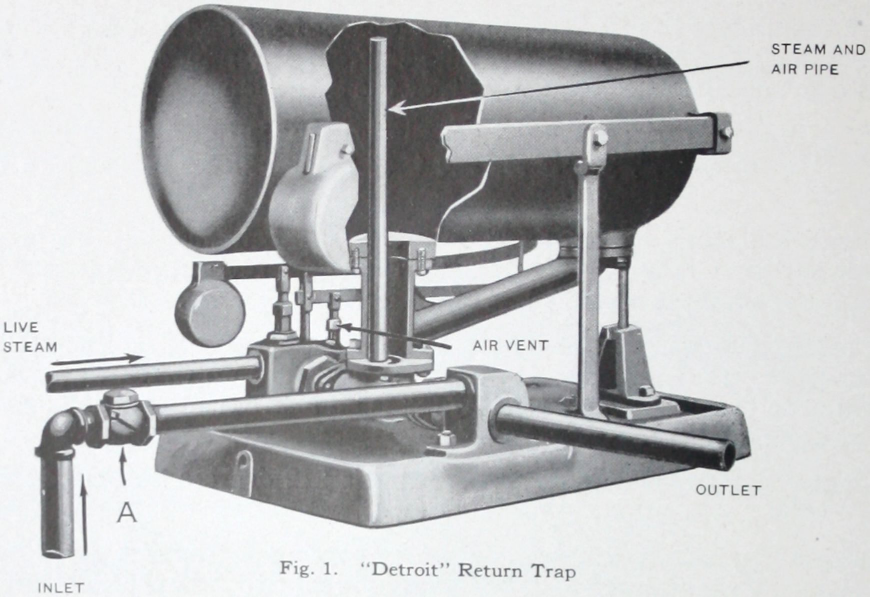


Fig. 1. "Detroit" Return Trap

By referring to the above illustration, the simplicity of the "Detroit" Trap is plainly shown. The water enters the right hand bearing through the inlet check valve, passing up into the tank through the hollow trunnion. Discharging, the water leaves by the same path, only through the outlet check valve.

The tank becoming two-thirds filled, its weight offsets the counterweight. On account of the tank being supported off center, this has a downward action on the tilt end. This tilting action is for the purpose of opening and closing the steam and air valves in the right hand bearing.

When the trap is filling, the steam valve is closed, but when discharging, opened to allow a pressure on the top of the tank to force the water out. The air valve is opened when the tank is filling and closed while discharging. Both the steam and the air pass through the upright pipe inside the tank by way of the right hand half of the hollow trunnion.

"Detroit" Systems for handling condensation increase the boiler horse power.

Direct Return—The "Detroit" Single System

The "Detroit" Single System is used when the steam pressure at the receiving tank is sufficient to raise the water to the return trap above the boiler.

OPERATION

The receiving tank being at the low point fills with the condensation by gravity, and due to the pressure on the system in the return lines, the water is forced up into the trap tank six feet above the water line of the boiler.

The trap tank is supported off center and is held in a horizontal or filling position by a large counterweight. The weight of the water when the tank becomes filled overbalances the counterweight and the trap tilts downward. This action opens the steam valve and admits boiler pressure above the water, thus equalizing the pressure in the trap and the boiler. Due to the position of the trap—six feet above the water line of the boiler—the water naturally flows into the boiler by gravity.

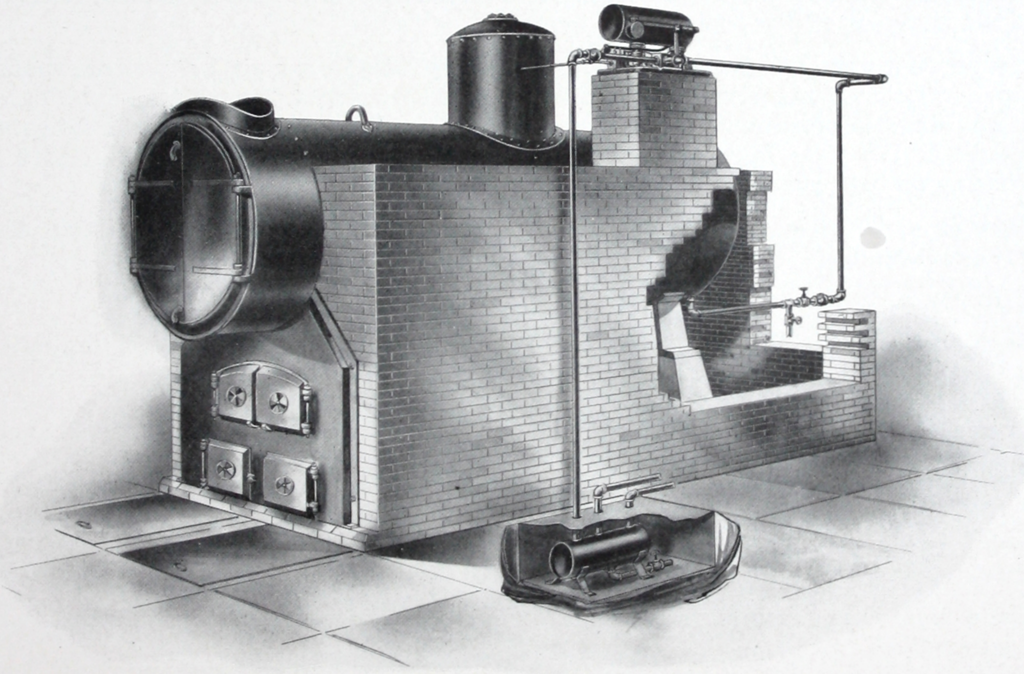
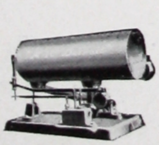
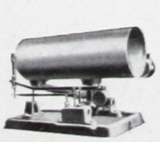


Fig. 2. The Single System.

Typical method of connecting up "Detroit" Return Traps for Single Trap System.



"Detroit" Systems for handling condensation increase the heater capacity.



The "Detroit" Single System

(Continued)

INSTALLATION

A receiving tank is always placed at the lowest point of the drip lines. The water must flow to it by gravity. The receiving tank is for the purpose of gathering all drip lines to one common header and also delivering the condensation to the Return Trap on top of the boiler.

The water inlet pipe from the receiving tank to trap must be protected by a swing check valve near the trap. (Inlet is marked.)

The water outlet pipe to the boiler must also be protected with a swing check valve near the trap; also one near the boiler. (Outlet is marked.)

The water inlet to boiler must be below water line in the boiler, generally through the blow-off.

The steam valve or the large valve must receive its steam directly from the dome of the boiler or off the main steam header.

The air vent valve, or the small valve, can be piped to the ash pit, hot well or exhaust pipe. The air vent valve should be allowed to blow slightly when trap is filling or in a horizontal position—this is to prevent air binding on the system. This valve should be left wide open if trap is working on low pressure and nearly closed if working on high pressure.

Blow-off at bottom of receiving tank must be connected to blow out sediment and dirt occasionally.

Drip in trap base should be connected over side of brick work.

Each drip line should be protected by a swing check valve near the receiving tank.

High pressure and low pressure should not be used on the same receiver.

The return trap should be placed at least six feet above the water line in the boiler.

Figure one pound pressure at the receiver for every two feet lift between bottom of receiver and top of trap.

Swing check valve on water inlet must swing towards the trap and the swing check valve on water outlet must swing away from the trap.

Use a high class swing check valve. Do not use a globe valve in steam line, but a gate valve.

Do not connect trap discharge line and pump line into the same boiler connection.

"Detroit" Systems for handling condensation decrease the coal bill.

Direct Return—The "Detroit" Double System

The "Detroit" Double System is used when the steam pressure on the return lines is insufficient to raise the water to the trap on top of the boiler. This is the case in exhaust steam heating.

OPERATION

When the lifting trap tank fills, it tilts downward, opening the live steam valve, which allows a pressure on the trap above the water. This pressure forces the condensation up to the return trap on top of the boiler. This upper trap receiving the water, fills and tilts forward, opening the live steam valve. Thus, the trap pressure being equal to the boiler pressure, the water by the law of gravity, flows into the boiler, due to its position, six feet above the water line.

When the traps have emptied, they automatically return to a filling position, closing the live steam valve and opening the air vent valve. Following immediately after the release of pressure in the trap tank the remaining vapor is condensed by the colder exterior of the tank—this produces a slight vacuum.

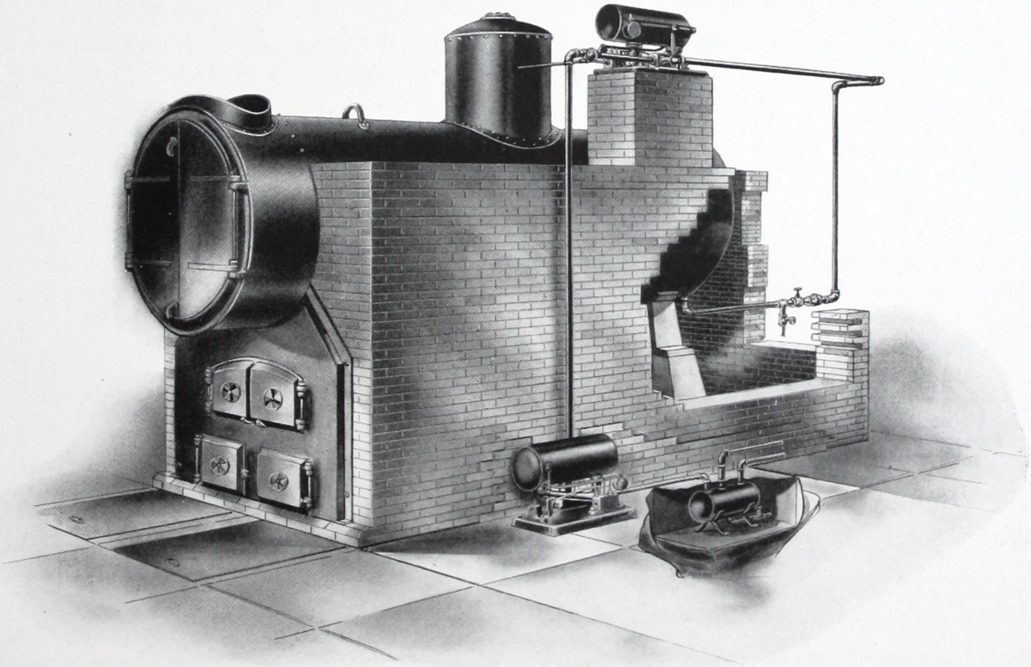
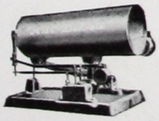
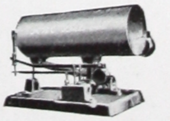


Fig. 3. The Double System.

Typical method of connecting up "Detroit" Return Traps for Double Trap System.



"Detroit" Systems for handling condensation decrease the water bill.



The "Detroit" Double System

(Continued)

These two actions cause the water and the air to rush into the trap for another filling operation. The tilting of the tank causes the vent valve to close and thus no steam can escape during the time the trap is delivering water.

INSTALLATION

A Trap, which in this case is called the lifting trap, is always placed at the lowest point of the heating, the drying or the cooking system for the purpose of receiving the condensation by gravity—also to handle the air in the heating coils. This lifting trap in turn delivers the condensation to the return trap on top of the boiler.

CONNECTION

The lower trap will do its best work installed near the system to be drained.

It is not necessary to have full boiler pressure on the steam valve of the lower trap—a pressure sufficient to lift the water to the upper trap is all that is required—one pound for each two feet lift.

The upper trap must, however, have full boiler pressure and must be placed at least six feet above the water line in the boiler.

Drip in base should be connected over side of brick work.

A receiver should be used in this double system when there is a large volume of condensation or when there are two or more drip lines. This receiver is placed before the lower trap and above it, and is protected by a swing check valve. All drip lines should have swing check valves near the receiver.

Both the lower and the upper traps are protected by swing check valves on the water inlets and outlets. Tappings for inlet and outlet are marked.

There is also a swing check valve on the water line to the boiler near the boiler, below the water line.

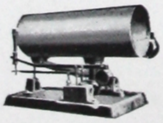
Water to the boiler must always enter the boiler below the water line, generally through the blow-off.

All swing check valves must open in the direction of the flow.

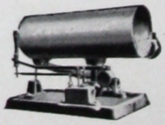
The trap must be set level.

Use gate valves in steam line.

"Detroit" Traps are adjusted ready for installation when shipped.



"Detroit" Systems for handling condensation decrease the initial cost.



The "Detroit" Combination System

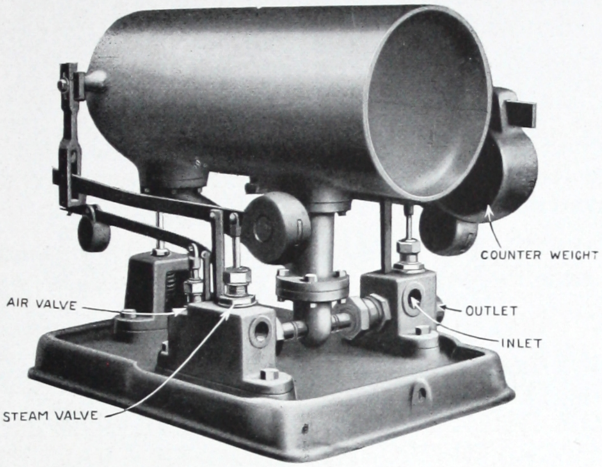


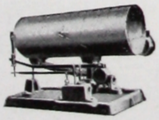
Fig. 4. "Detroit" Combination Trap.

It often happens that in heating, there is at times a wide variation in steam pressure, such as exhaust in the day time and live steam at night. In an installation of this nature, the "Detroit" Combination Trap is used.

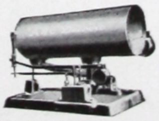
In its operation and design, it is like the "Detroit" Double System, only it has a control valve on the water outlet. This valve is automatic, being operated by a lever from the tank.

The "Detroit" Metering System

Nowadays it is very desirable in boiler room practice to measure the feed water. There is not any better system than the "Detroit." It is simple, reliable and accurate. Each dump requires the same number of pounds of water regardless of its temperature. This means exact readings. The number of dumps is registered on a counter.



"Detroit" Systems for handling condensation decrease the yearly maintenance.



The "Detroit" Boiler Feed System

The "Detroit" Boiler Feed System, which is an application of the Double System, is today being used by a number of large plants to feed the boilers in the place of a boiler feed pump.

This application has a number of distinctive advantages. A "Detroit" Trap has only one quarter of the number of moving parts a pump has. There are no valves, pistons or rings to wear and leak. The trap is outside packed. Then, too, there is no oiling system, nor are there throttle valves. These two items alone mean a saving of 75% of attention.

There is no slip in the action of the system.

Every time it discharges, a fixed quantity of water is handled. This feature acts as a meter on the feed water. The feed water temperature does not affect the operation of the system—therefore there is no steam binding.

On top of all this, the "Detroit" System is absolutely reliable and positive in action and its operation calls for only one-fourth of the amount of steam required by a pump.

The "Detroit" Vacuum Line System

FOR DRAINING VACUUM LINES OR ANY APPARATUS WORKING UNDER A VACUUM

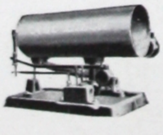
In construction the "Detroit" Vacuum Line System is a modification of the "Detroit" Return System.

The water enters and is discharged through check valves. These check valves must be perfectly tight in order to preserve the vacuum.

The "equalizing valve" corresponds to the "air vent valve" on a return trap, in that it remains open when the trap is filling, but is closed when discharging. A connection from the equalizing valve is made directly back into the vacuum line or receiver. The vacuum in the trap being equal to that within the system being drained and the trap being located at some point below, the water simply flows to the trap by gravity. The trap in tilting when filled engages with the lever opening the live steam valve, and the water is discharged under pressure from the trap.

Live steam supply need not be connected directly to the boiler, as the pressure should not be in excess of that necessary to discharge the contents of the trap. A valve in the steam line partially opened will suffice.

Upon receipt of full explanation of any unusual conditions, accompanied by sketches, if possible, we will gladly recommend what in our judgment will best suit the conditions.



Every ten degrees raise in the boiler feed water, means 1% saving in the coal bill. Use a "Detroit" System.

The "Detroit" Vacuum System

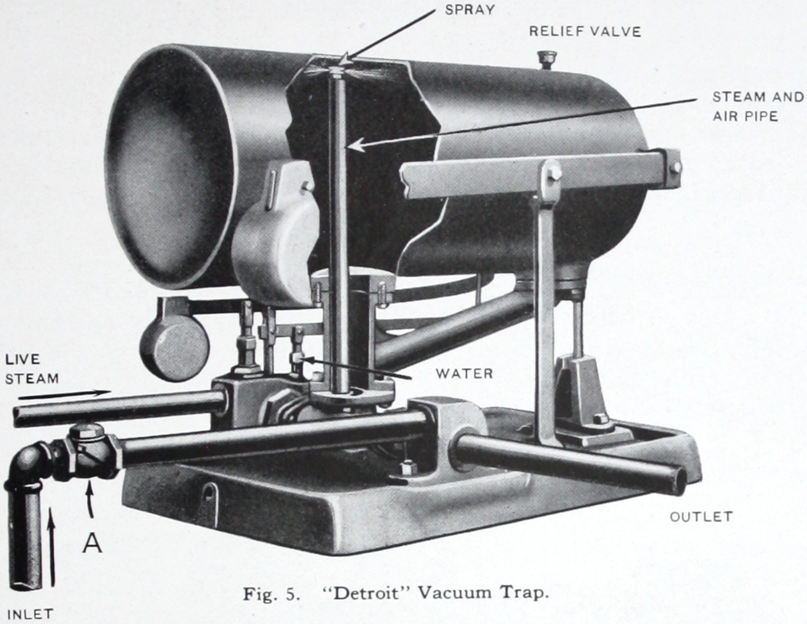
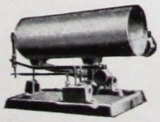


Fig. 5. "Detroit" Vacuum Trap.

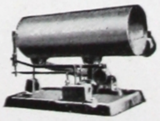
The "Detroit" Vacuum System is one in which a small spray of cold water is allowed to come in contact with the hot vapor or steam in the trap tank. This quickly condenses the hot vapor or steam, which has been used to discharge the water from the tank, and forms a vacuum.

OPERATION

When the Vacuum Trap fills it tilts downward, opening the live steam valve, which allows a pressure on the trap above the water. This pressure forces the condensation up to the return trap on top of the boiler. This upper trap receiving the water fills and tilts forward, opening the live steam valve. Thus the trap pressure being equal to the boiler pressure, the water by the law of gravity flows into the boiler, due to its position six feet above the water line. When the traps have emptied they automatically return to a filling position, closing the live steam valve and opening the air vent valve on the upper trap and the cold water valve on the Vacuum Trap.



In using the "Detroit" System as a boiler feed, it requires less than ¼ the volume of steam to do the same work as a boiler feed pump. Use a "Detroit" System.



The "Detroit" Vacuum System

(Continued)

INSTALLATION

The Vacuum Trap is placed at the low point of the heating system, but under some conditions it is necessary that the condensation be raised. This can be done, but the distance is limited.

The Vacuum System always *requires* the Double Trap System, that is, the Vacuum Trap, or the lower trap, receives the condensation by its vacuum and lifts it to the Return Trap on top of the boiler. This upper trap is at least six feet above the water line, and discharges its water to the boiler through the blow-off. A receiving tank is always used when there are two or more return lines.

CONNECTION

Figure one pound pressure on the lower trap for each two feet lift.

THE VACUUM OR LOWER TRAP

The water inlet from the heating system must be protected by a swing check valve, near the trap. (Inlet is marked.)

The water outlet to the upper trap is also protected by a swing check valve, and marked.

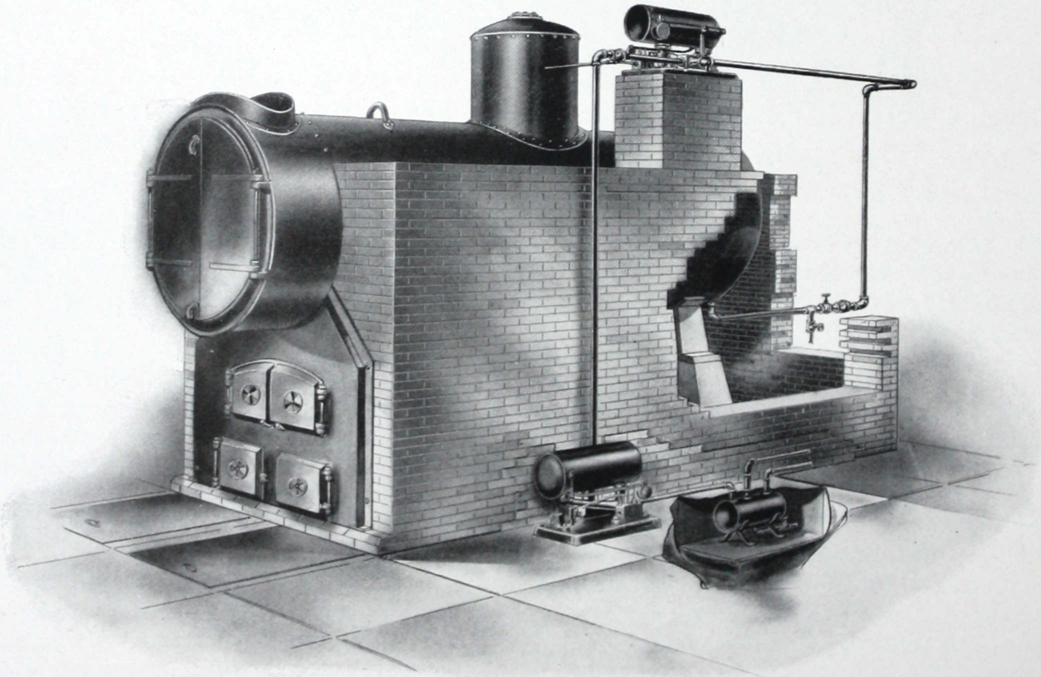
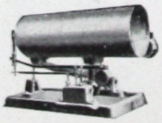
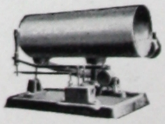


Fig. 6. Typical Method of Connecting up "Detroit" Vacuum System.



Temperature having no effect upon "Detroit" Traps, the water is fed to the boiler at the same temperature at which it is condensed. Use a "Detroit" System.



The "Detroit" Vacuum System

(Continued)

The steam valve (or the large valve) is connected to the main steam line.

The cold water valve (or the small valve) is connected to the water supply—that is, the city main or tank pressure.

A graduated valve should be used on this cold water line to trap, in order to have full control of the spray and make up water. It does not require much water to form a vacuum, but the water supply should be regulated by the water level in the boiler.

An automatic air and vacuum valve is furnished with each trap for the trap tank.

THE RETURN OR UPPER TRAP

Return Trap receives its steam from the dome of the boiler or the main steam header, through the steam (or large valve).

The air vent (or small valve) is piped to the ash pit, heater or hot well.

The outlet to the boiler blow-off is protected by a swing check valve near the boiler below the water line.

The Vacuum Trap will do its best work installed near the system to be drained. Do not use globe, but gate valves in the steam lines.

For heating large offices and public buildings, hotels, hospitals, schools, manufacturing plants, etc., this is the ideal system.

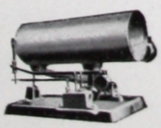
If there is not sufficient boiler pressure to raise the water see the "Detroit" Electric Pump Unit System, Pages 16 and 17.

The following features recommend the "Detroit" Vacuum System for work of this character:

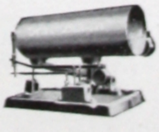
1. Temperature has no effect upon the operation of the trap.
2. The trap requires but one-quarter the amount of steam consumed by a pump.
3. No oil troubles.

The "Detroit" Lifting or Pumping System

When using the "Detroit" Return Trap to raise water from one level to another, place the trap so that the water will drain to it by gravity; connect with live steam, either directly from the boiler, or from any convenient steam pipe that will furnish pressure to raise the water the desired height. Regulate the supply of steam by a cut-off valve, admitting no more than is necessary to lift the water. Set the check valves in the same manner as when erecting the return trap to discharge the water into the boiler against pressure.



"Detroit" Systems for handling condensation increase the heating circulation.



"Detroit" Systems for Handling Condensation in Low Pressure Heating Systems

On account of the increasing demand for Vapor and Low Pressure heating it has been necessary to design three classes of systems to handle the condensation—

I. "DETROIT" ELECTRIC PUMP UNIT

Where the radiation is below the water line of the boiler the heating system requires a "Detroit" Electric Pump Unit. The Unit is placed below the radiation.

The condensation flows to the trap by gravity—the air being taken care of by the air vent and an automatic air valve. This, therefore, means an open end return line.

As the "Detroit" Trap fills it tilts downward and remains in this position as long as there is any water in the system. In tilting downward, it throws in a snap switch, starting the motor and the centrifugal pump—the pump discharging the water into the boiler.

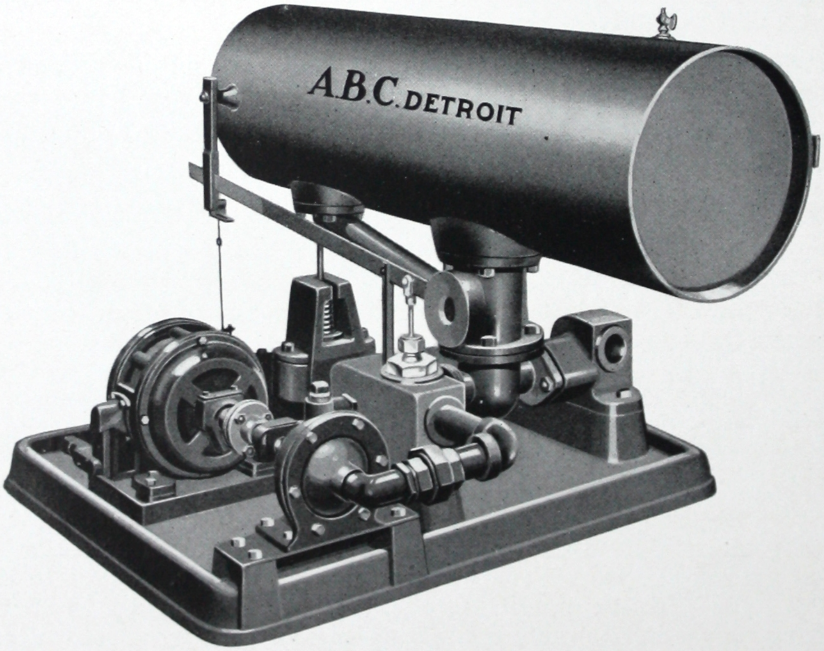
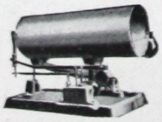


Fig. 7. "Detroit" Electric Pump Unit for Low Pressure Heating Systems.



"Detroit" Systems for handling condensation increase the heating surface.

Low Pressure Heating

(Continued)

By means of the vacuum on the pump the water and air are removed from the system.

The "Detroit" Electric Pump Unit has the following features:

1. A positive motion.
2. No floats.
3. No burning out of switches.
4. No sticking.
5. Low cost of operation.
6. An increased heating circulation.
7. Pit the Pump Unit and not the boilers.

II. THE "DETROIT" OPEN END RETURN SYSTEM

Where the radiation is above the water line at the boiler the "Detroit" Open End Return System is used. A "Detroit" Trap is placed between the radiation and the water line of the boiler. The trap having an air vent allows the condensation to flow to this point, giving an open end return. This installation is to do away with the old gravity idea. It increases the circulation. It does away with air binding. It means a perfect heating control. See Fig. 29, Page 24.

III. THE "DETROIT" VACUUM SYSTEM

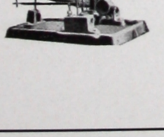
In a fairly large heating plant, such as an office building, hotel, hospital, large school, factory, etc., it is often decided to install a Vacuum System. An installation of this nature has always fallen to the lot of the Vacuum Pump, but in order to get away from all the troubles of the Pump the engineers are asking for the "Detroit" Vacuum System.

On a one pipe system the drip and the air line are run to the Vacuum Trap, each protected with a check valve.

On a two pipe system the drip is brought to the Vacuum Trap through a check valve.

On an installation of this nature, the "Detroit" Vacuum System has made a big showing in cutting coal bills, increasing heating, and reducing general heating troubles.

See "Detroit" Vacuum System, Pages 13 to 15.



"Detroit" Systems for handling condensation increase the engine horse power.

"Detroit" Separating Traps

The "Detroit" Separating Trap is designed primarily for draining high pressure steam mains, receivers, steam separators, etc., holding the steam in check and at the same time returning condensation to feed water heater or hot well, but not to the boiler.

OPERATION

The operation of the "Detroit" Separating Trap is not dependent upon the buoyancy of some hollow float, or the contracting or expanding of certain parts, but simply upon the weight of the water in the tank acting against the counter-balance weight, to open and close the outlet valve. *There is absolutely nothing inside the tank. Every working part is on the outside and easily accessible.* These traps have large capacities and are quick to act.

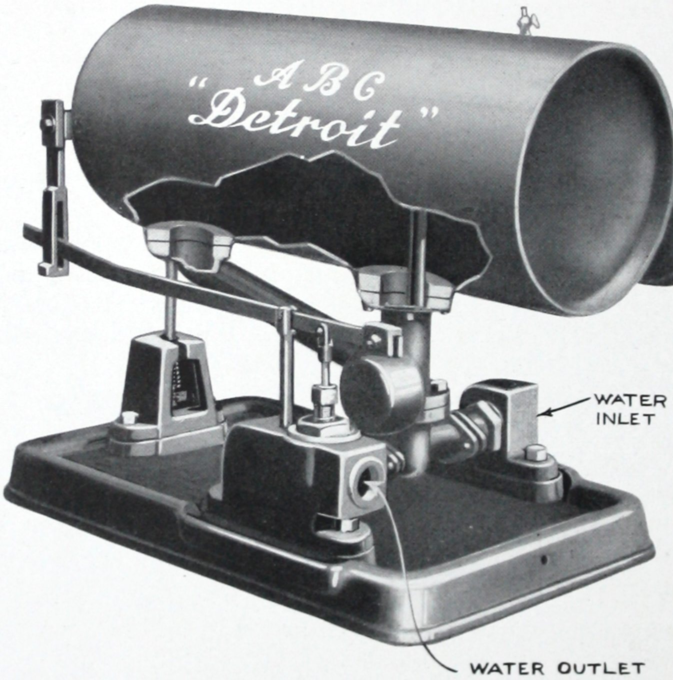
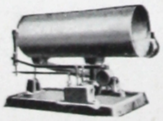


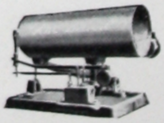
Fig. 8. "Detroit" Separating Trap.

INSTALLATION

The trap must be placed low enough so that the return or drip line drains to it by gravity. As the trap becomes nearly filled, the weight of the water overcomes the counterbalance weight; the tank tilts forward, engaging with a lever which auto-



"Detroit" Systems for handling condensation increase the boiler horse power.



matically opens the outlet valve. The counterbalance weight is adjusted so as to bring back the tank to a filling position, closing the outlet valve before the entire contents are delivered, thus holding an effective water seal at all times. Air binding is prevented by the relief cock on top of the tank, which is allowed to blow slightly. Large slugs of water can be handled by a small trap since it will remain in a discharging position until all of the water is drained out of the line—therefore it is impossible to flood.

Receivers for "Detroit" Systems

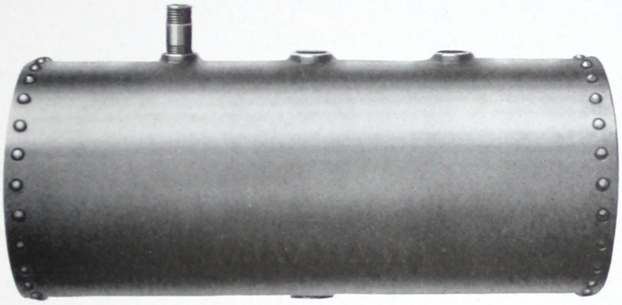


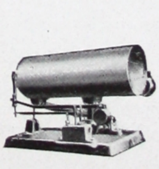
Fig. 9. "Detroit" Receiver.

The receiver acts as a collecting chamber for all drip lines, keeping returns thoroughly drained during the momentary hold-up while the return trap is discharging—and, as outlined in previous paragraphs, should be placed at the lowest point in the system so that all returns will drain thereto by gravity.

"Detroit" Receivers are especially designed for this use. The supply pipe to the steam trap extends nearly to the bottom of the receiver. Water is supplied to the trap, even though but a small quantity is being condensed.

The water is elevated out of the receiver into the trap, because of the fact that for every pound of steam pressure carried on the system being drained, the water can be lifted two feet high out of the closed receiver. This is approximately correct and is based on the fact that a column of water exerts a pressure at its base, due to its weight, of one pound per square inch for each 27.67 inches height, regardless of its size or shape.

"Detroit" Systems for handling condensation decrease the coal bill.



General Instructions

COUNTERWEIGHT

This weight is for the purpose of keeping the trap in a horizontal or filling position. The weight should be adjusted to bring the tank back with a sharp action. The weight should never be moved ahead of the mark which is on the arm. Sometimes it is necessary to move it towards the end of the arm about one-half inch or so. This is generally the case when the trap is new or has been repacked.

TRUNNION PACKING

The Trunnion should be packed at least once a year. The Trunnion packing is a special packing. Cut in ring form and to size. The ring joints should be altered. Do not let a joint come on the bottom. The Fibre ring goes in first. Save time and trouble by ordering this special packing from THE AMERICAN BLOWER COMPANY.

STEAM AND AIR VENT VALVE PACKING

This Packing is a Valve Stem Palmetto Twist.

STEAM AND AIR VENT VALVE COUNTERWEIGHTS

These weights do not need adjusting at any time.

TRUNNION GLAND

It is not necessary to draw up the gland with a wrench. Your fingers will do. Draw the gland up evenly.

STEAM VALVE

The Steam Valve should open wide under all conditions. If it is necessary to cut the force of the steam down on the lower or lifting trap, do this with the valve in the steam line to trap.

STEAM VALVE STEM

The Steam Valve Stem should have a travel of ¼″ or better.

STEAM VALVE LEVER

This lever should never ride against the top nor the bottom of the guide arm, but about in the center.

AIR VENT VALVE LEVER

This lever should have a travel upward of about two inches. It should be free on the guide when tank is tilted downward.

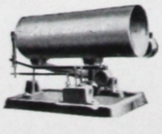
SEATS AND DISCS

Both the seats and discs are removable. They are made of a special metal.

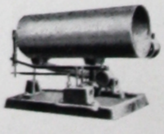
IMPORTANT NOTE

"Detroit" Traps are tested before leaving the factory.
"Detroit" Traps are guaranteed by the AMERICAN BLOWER COMPANY.

WE ARE AT YOUR SERVICE



"Detroit" Systems for handling condensation decrease the water bill.



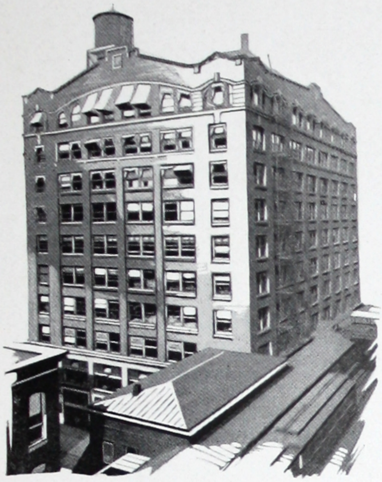


Fig. 10

Hirsch-Wickwire, Chicago, Ill.
Use "Detroit" Steam Traps on their heating system; these Traps replaced their pumps.

Fig. 11

Fidelity Trust Co., Buffalo, N. Y.
"Detroit" Vacuum Trap on Heating system.

Fig. 12

W. C. Hickok Mfg. Co., Harrisburg, Pa.
"A B C Detroit" Traps on up-to-date Heating Plant.

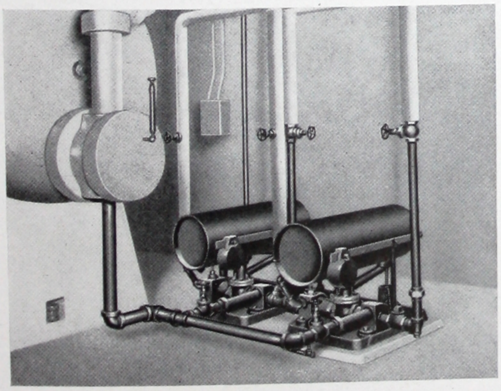


Fig. 13

Anheuser-Busch Co., St. Louis, Mo.
"Detroit" Traps—Hot Water Heaters.

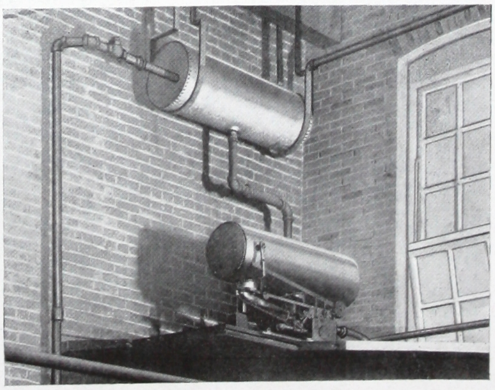


Fig. 14

"Detroit" Trap and Receiver, installed above boiler for returning condensation to boilers.

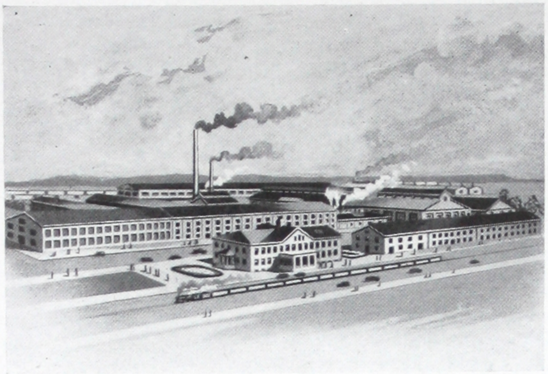


Fig. 15

Sprout, Waldon & Company of Muncy, Pa., also find the "Detroit" Boiler Feed System for handling condensation very economical and desirable. Here the "Detroit" System has done away with the boiler feed pump, also the vacuum pump.

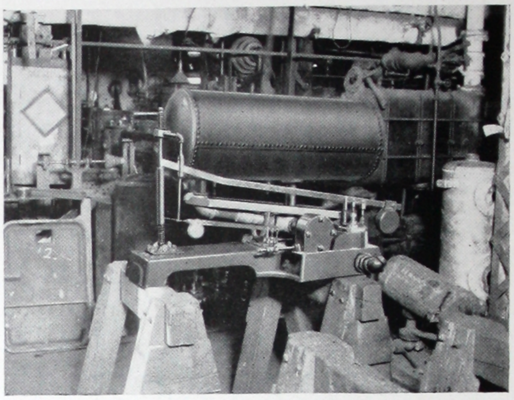


Fig. 16

This trap has been in constant service for 16 years.

Fig. 17

Woodbine Steam Laundry, East Liverpool, Ohio

"Detroit" Trap handling all of the condensation from laundry machinery increased the laundry output and reduce d the cost.

Fig. 18

Wilson & Co., Chicago, Ill.

Use "Detroit" Traps in many places.

Fig. 19

Royal Oak High School, Royal Oak, Mich.

"Detroit" Traps return condensation from heating system.

Fig. 20

Montgomery Brothers Co., Buffalo, N. Y.
Use No. 12 "Detroit" Vacuum Trap on their Dry Kilns —also Return Trap, returning the water at 320 degrees F. in the winter and 260 degrees F. in the summer.

Fig. 21

Temple Theater, Rochester, N. Y.
"Sirocco" Fan System. Double "Detroit" Return Trap System on Heating System.

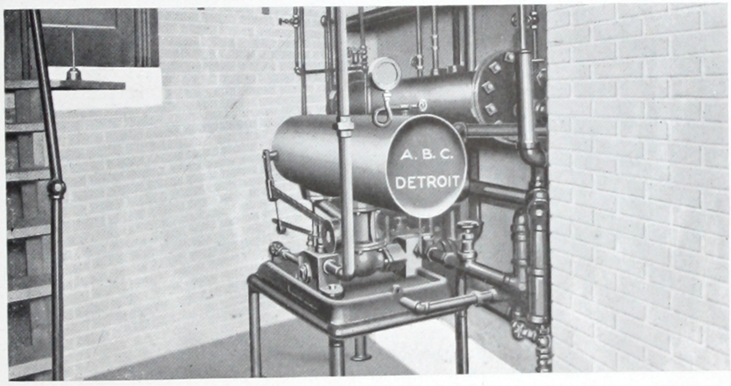


Fig. 22

Lewiston Hospital, Lewiston, Maine
"Detroit" Vacuum Trap handling the heating system.

Fig. 23

Lewiston Hospital, Lewiston, Maine
"Detroit" Traps handle condensation from heating system directly to boilers.

Fig. 24

Hill Mill, Lewiston, Maine
"Detroit" Traps handle condensation from heating system and dryers directly to boilers.

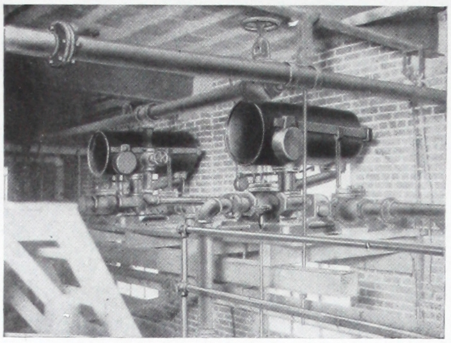


Fig. 25

These two "Detroit" Systems at the Diamond Crystal Salt Company's plant in St. Clair, Mich., each feed two 350 horse-power boilers. Water has a temperature of 290 degrees F.

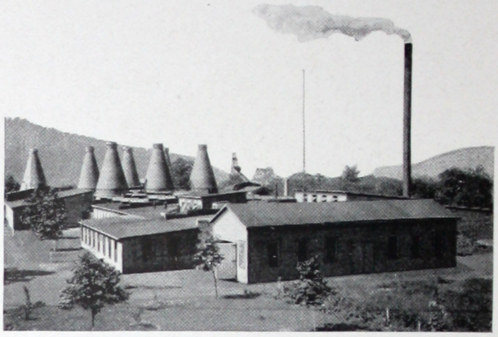


Fig. 26

Smith, Phillips China Co., East Liverpool, Ohio

"Detroit" Traps return the water from the heating system. The Factory was never so hot.

Fig. 27

Dwight Lumber Co., Detroit, Mich.

Have used "Detroit" Traps for sixteen years; these traps are still in use and operate as well as when new.

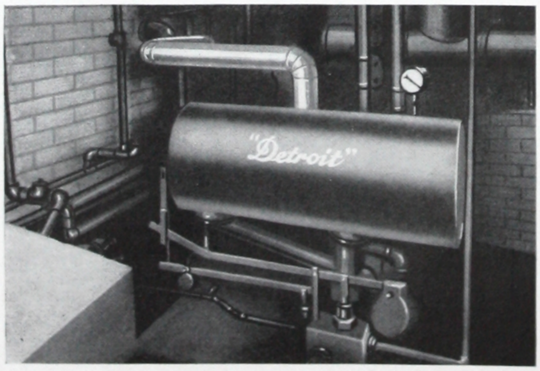


Fig. 28

This illustration shows the "Detroit" Vacuum System in the building of The Fidelity Trust Company of Buffalo, New York. A one pipe heating system, 8 oz. pressure.

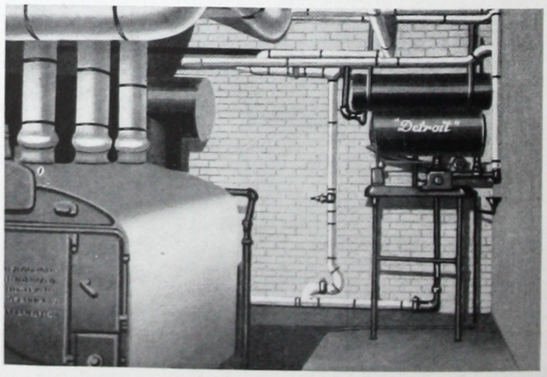


Fig. 29

In the Green Street School of Hazleton, Penn., the "Detroit" Open End Return System is installed on a vapor heating system. As the illustration shows, the base of the trap is but six inches above the water line of the boiler.

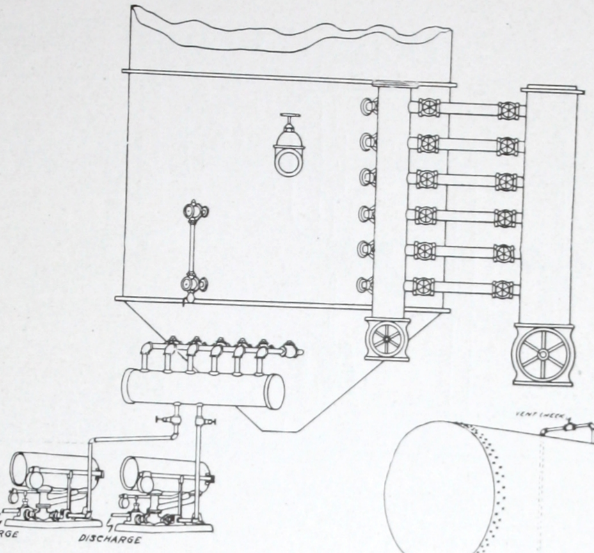


Fig. 30

"Detroit" System on a Vacuum Pan.

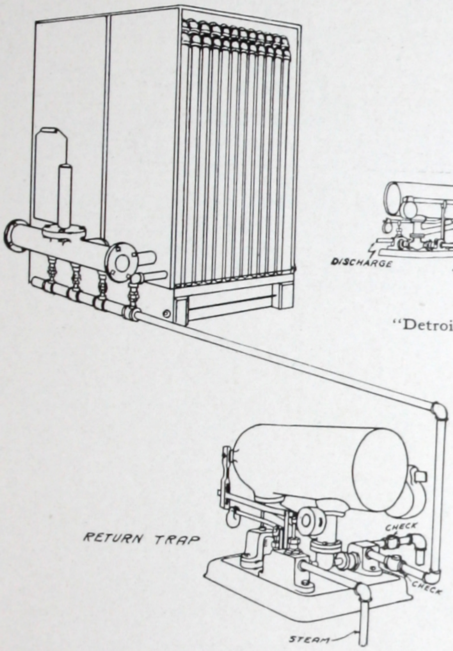


Fig. 31

"Detroit" Return System Applied to American Blower Co. Heater, Returning Hot Condensation Direct to Boiler.

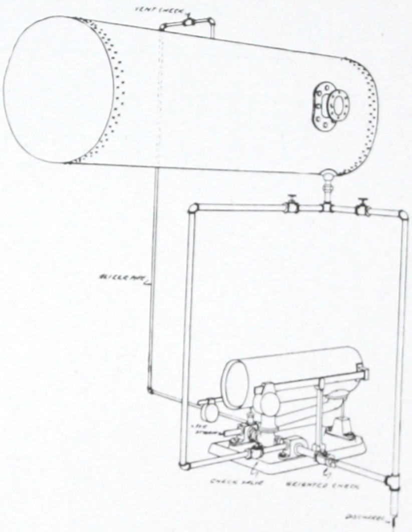


Fig. 32

"Detroit" Vacuum Line Drain System as applied to receiver handling a vacuum.

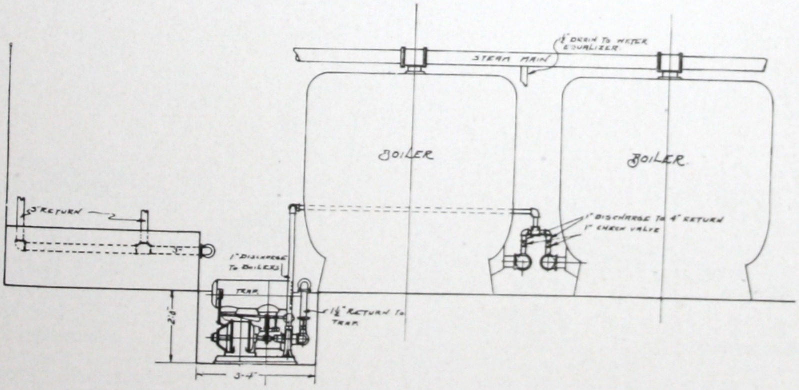


Fig. 33

"Detroit" Electric Pump Unit System as Applied to Low Pressure Heating. Part of the Radiation Being Below the Boiler Water Line.

"Detroit" Return Trap

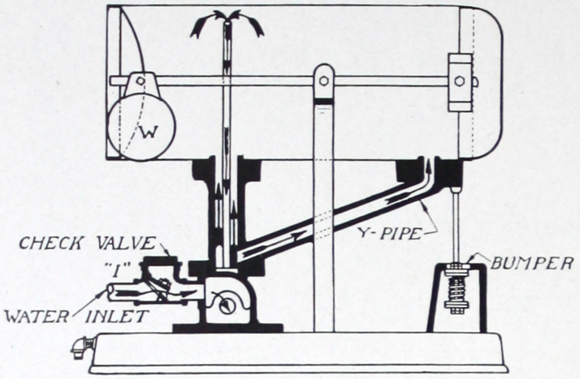


Fig. 34

This illustration shows the water side of the trap in the filling position, receiving the condensation from the system through the inlet check valve, passing through the Y-pipe in both directions and filling the tank. Also illustrates the air from the tank and system escaping through the stand pipe.

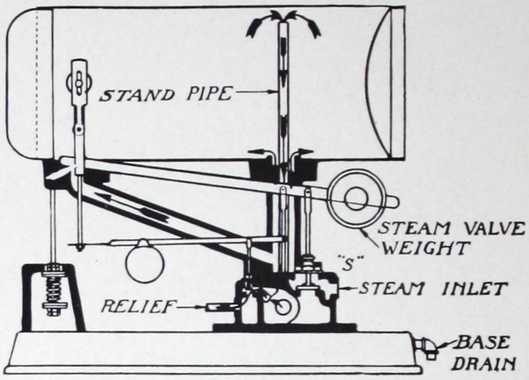


Fig. 35

This illustration shows the steam side of the trap in a filling position. The water is shown entering the trap in both directions through the Y-pipe, forcing the air out through the stand pipe. Also shows the air vent valve off the seat, the steam valve being closed.

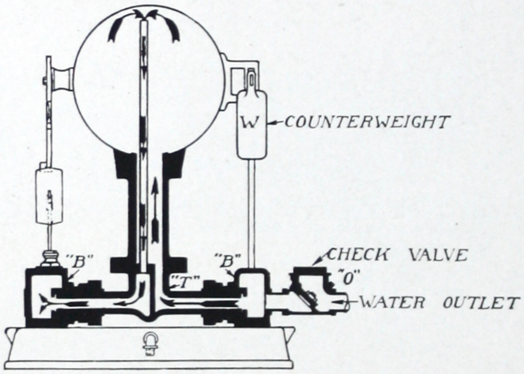


Fig. 36

This illustration gives a good idea of the trunnion construction and the position of the check valve in outlet pipe while trap is filling. Note the water entering the water bearing to the right and the air escaping through the steam bearing to the left.

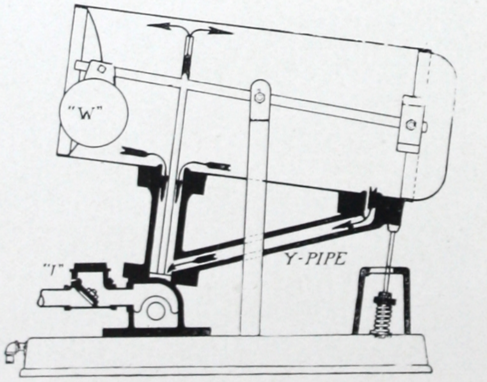


Fig. 37

This illustration shows the steam entering the trap through the stand pipe, forcing the water through the Y-pipe in both directions. Also shows the check valve on the inlet pipe closed during the emptying of the trap tank.

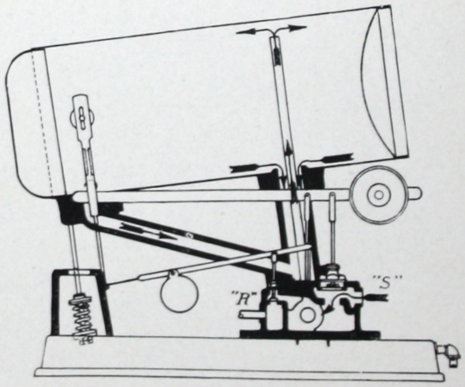


Fig. 38

This illustration shows the steam side of the trap during the operation of the discharging of water. The water is shown leaving the trap through the Y-pipe in both directions, the steam entering through the stand pipe, the air vent valve closed, steam valve opened.

"Detroit" Return Traps

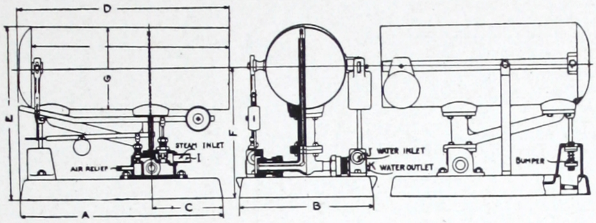


Fig. 39

DIMENSIONS IN INCHES

Trap	A	B	C	D	E	F	G	H	I	J	K
10	23½	16	7½	26½	20¾	16	8½	20	½	¾	¾
11	26¾	18½	8¾	30	23½	17⅞	10	24	¾	1	1
12	30¾	20½	10¾	35	26	19⅝	12	30	1	1¼	1¼
13	37	23⅛	11⅝	47	30	22½	14	36	1¼	1½	1½
14	39	25¾	12¼	48½	32¾	24¼	16	38	1½	2	2
15	43	31	15¼	52	38	28½	18	42	2	2½	2½
16	43	31	15	52	38	28½	18	42	2	3	3

Size Trap	Water Inlet and Outlet	Size Steam Inlet	CAPACITY			Approx. Shipping Weight	Telegraphic Code Word
			Pounds Per Hour	Square Feet Direct Radiation	Lineal Feet 1-inch Pipe Direct Radiation		
10	¾″	½″	960	3200	9600	275	Dabbler
11	1	¾	1500	5000	15000	325	Dale
12	1¼	1	2500	8300	25000	425	Dabster
13	1½	1¼	4000	13300	40000	500	Dacapo
14	2	1½	7500	25000	75000	700	Dactyl
15	2½	2	12000	40000	120000	900	Daddock
16	3	2	22000	73500	220000	1000	Dagger

NOTE.—No check valves, no gate valves or pipe fittings are included with Traps. Such items, when furnished by us, are extra.

Capacities are based on average direct radiating conditions. Extreme conditions, such as obtain in greenhouses, dryers for wet goods, blower systems, etc., should be referred to our Engineering Department for selection of size. Florists should specify amount of glass surface in greenhouses.

NOTE.—Always obtain Steam Pressure carried—this is important and should be specified on all inquiries and orders.

“Detroit” Separating Traps

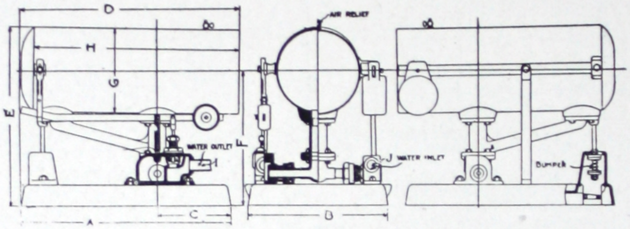


Fig. 40

DIMENSIONS IN INCHES AND GENERAL DATA

Trap	A	B	C	D	E	F	G	H	I	J	App. Ship'g Weight	Telegraphic Code Word
10	24	16½	7¾	26½	20¾	16	8½	20	¾	¾	275	Daggle
11	27¼	19	9	30	23½	17⅞	10	24	1	1	325	Daglock
12	31¼	21	11	35	26	19⅝	12	30	1¼	1¼	425	Dagoba
13	37½	23⅝	11⅞	47	30	22½	14	36	1½	1½	500	Dagswain
14	39½	26¼	12½	48½	32¾	24¼	16	38	2	2	700	Daker

NOTE—Always obtain steam pressure carried.

CAPACITY TABLES—POUNDS OF WATER PER HOUR

Traps Fitted with Low Pressure Valves						Traps Fitted with High Pressure Valves					
Pressure Lbs. per sq. in.	No. 10	No. 11	No. 12	No. 13	No. 14	Pressure Lbs. per sq. in.	No. 10	No. 11	No. 12	No. 13	No. 14
5	1010	2400	3620	4800	8050	100	3060	6800	12000	19300	29000
10	2040	3680	4800	7000	11500	120	3200	7740	13100	21000	32000
20	2800	5600	7660	9700	16000	140	3400	8250	14000	22600	35200
30	3950	7250	9900	12500	21000	150	3580	8400	14580	23700	36000
40	4600	8400	11500	14000	24800	160	3650	8750	15050	24000	37000
50	5100	9560	12900	16100	27300	175	4100	9000	15750	25000	39000
60	5500	10200	14250	18100	30000	200	4360	9680	16200	26800	42000
75	6080	11100	16200	20100	33700						

Capacities are actual when friction is not greater than the equivalent of a 50-foot horizontal supply pipe of full inlet size in addition to friction through traps. For elevating water the delivery efficiency will decrease at the rate of approximately one pound for every two feet lift.

The "Detroit" Receivers

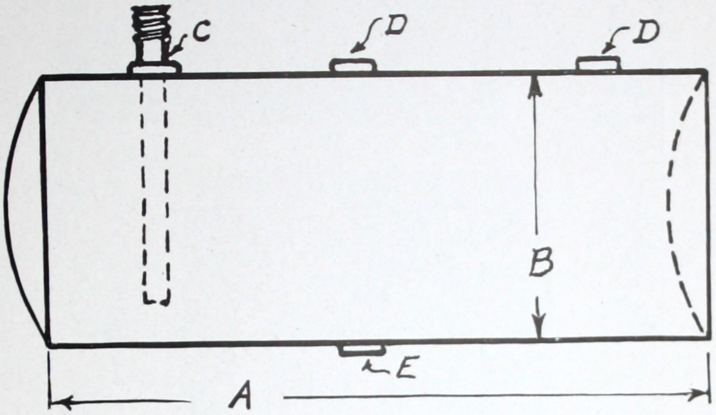


Fig. 41

DIMENSIONS IN INCHES

Traps Used for	Weight Lbs.	A	B	C	D	E	No. of Inlets
10–11	25	20	12	1	1¼	1	2
12	35	30	12	1¼	1½	1¼	2
13–14	60	40	16	2	2	2	3
15–16	100	40	18	3	2½	3	3

Receiver does not include saddle.

"Detroit" Electric Pump Unit

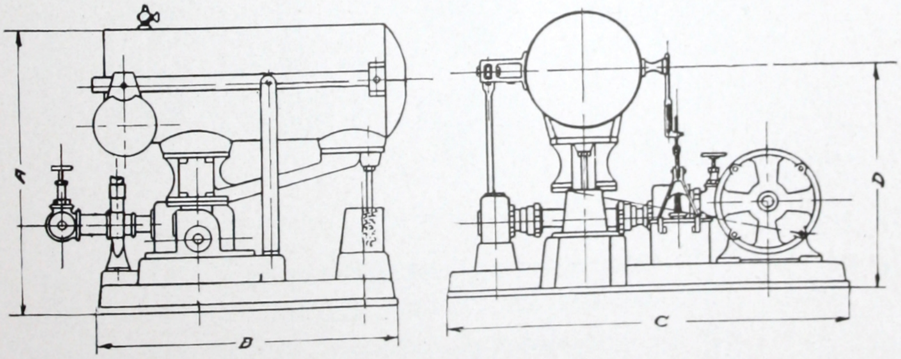
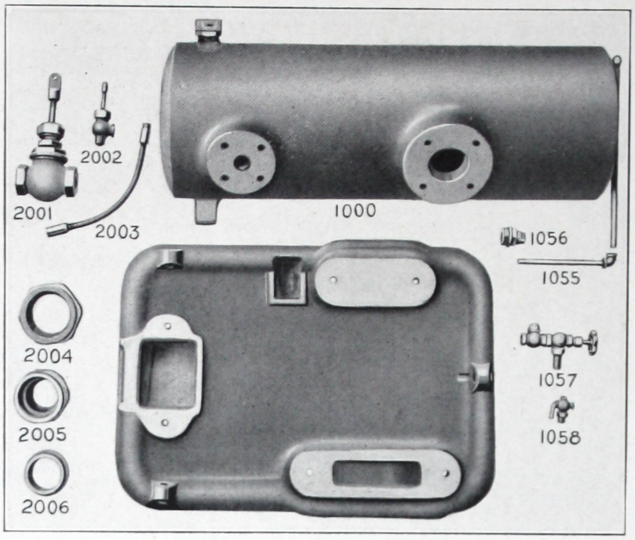


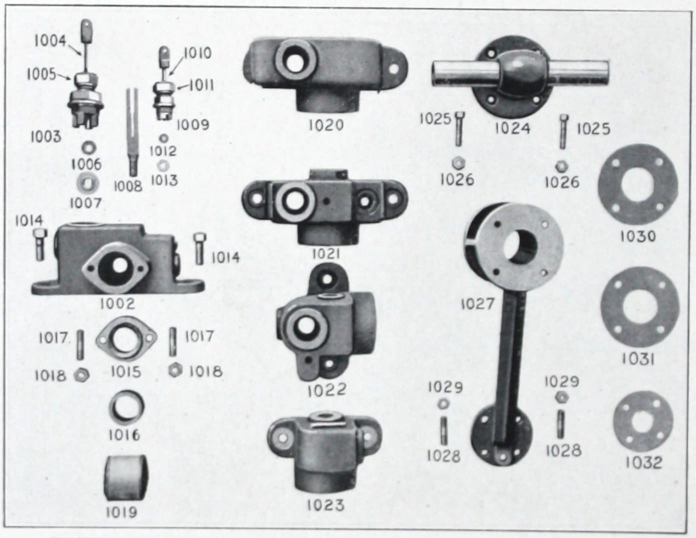
Fig. 42

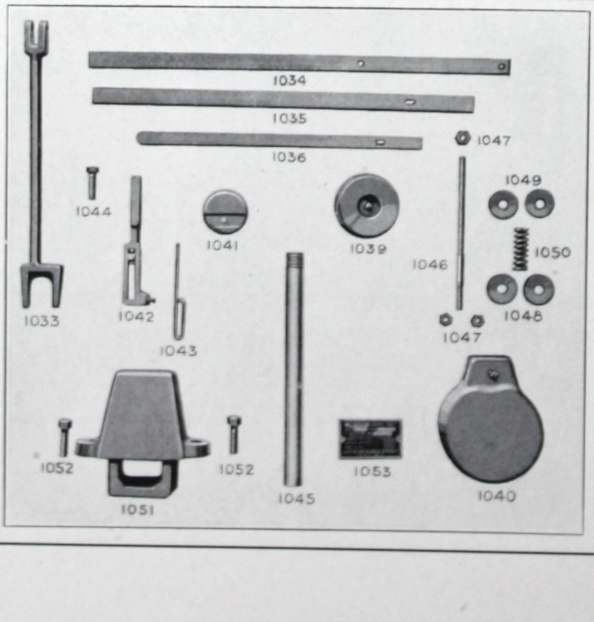
Size	Water Inlet and Outlet	Shipping Weight, Pounds	A	B	C	D	Motor H. P.	Size Pump	CAPACITY			
									Gal. per Min.	Sq. Feet Direct Radiation	Sq. Feet Hot Blast Radiation	Max. Pres. to Pump Against
1	1″	550	2′ 1½″	2′ 3″	2′ 11¼″	8½″	½	1	10	7,000	1400	15 lbs.
3	1½″	800	2′ 8½″	2′ 9½″	2′ 4″	2′ 1$\frac{5}{16}$″	¾	1½	20	14,000	2800	15 lbs.

The outfit is furnished complete, including receiving tank, direct connected pump and motor, automatic switch, and cast iron base, with wiring between pump and switch, connection between pump and tank, but without valves, fittings, or wiring outside the unit.

Sectional Views Showing Repair Parts for "A. B. C. Detroit" Steam Traps







Handy Information

Properties of Saturated Steam

Vacuum—Inches of Mercury	Absolute Pressure Lbs. per Sq. Inch	Temperature Fahrenheit	Total Heat Above 32° F.		Latent Heat (L) L=H—h Heat Units	Volume, Cu. Ft. in 1 Lb. of Steam	Weight of 1 Cu. Ft. Steam, in Lbs.
			In the Water (h) Heat Units	In the Steam (H) Heat Units			
29.74	0.0886	32.	0.00	1073.4	1073.4	3294.	0.000304
29.67	0.1217	40.	8.05	1076.9	1068.9	3243.8	0.000410
29.56	0.1780	50.	18.08	1081.4	1063.3	1702.	0.000587
29.40	0.2562	60.	28.08	1085.9	1057.8	1208.	0.000828
29.18	0.3626	70.	38.06	1090.3	1052.3	871.	0.001148
29.89	0.505	80.	48.03	1094.8	1046.7	636.8	0.001570
28.50	0.696	90.	58.00	1099.2	1041.2	469.3	0.002131
28.00	0.946	100.	67.97	1103.6	1035.6	350.8	0.002851
27.88	1.0	101.83	69.8	1104.4	1034.6	333.0	0.00300
25.85	2.0	126.15	94.0	1115.0	1021.0	173.5	0.00576
23.81	3.0	141.52	109.4	1121.6	1012.3	118.3	0.00845
21.78	4.0	153.01	120.9	1126.5	1005.7	90.5	0.01107
19.74	5.0	162.28	130.1	1130.5	1000.3	73.33	0.01364
17.70	6.0	170.06	137.9	1133.7	995.8	61.89	0.01616
15.67	7.0	176.85	144.7	1136.5	991.8	53.56	0.01867
13.63	8.0	182.86	150.8	1139.0	988.2	47.27	0.02115
11.60	9.0	188.27	156.2	1141.1	985.0	42.36	0.02361
9.56	10.0	193.22	161.1	1143.1	982.0	38.38	0.02606
7.52	11.0	197.95	165.7	1144.9	979.2	35.10	0.02849
5.49	12.0	201.96	169.9	1146.5	976.6	32.36	0.03090
3.45	13.0	205.87	173.8	1148.0	974.2	30.03	0.03330
1.42	14.0	209.55	177.5	1149.4	971.9	28.02	0.03569
Lbs. Gauge							
0.0	14.7	212.0	180.0	1150.4	970.4	26.79	0.03732
0.3	15.0	213.0	181.0	1150.7	969.7	26.27	0.03806
1.3	16.0	216.3	184.4	1152.0	967.6	24.79	0.04042
2.3	17.0	219.4	187.5	1153.1	965.6	23.38	0.04277
3.3	18.0	222.4	190.5	1154.2	963.7	22.16	0.04512
4.3	19.0	225.2	193.4	1155.2	961.8	21.07	0.04746
5.3	20.0	228.0	196.1	1156.2	960.0	20.08	0.04980
10.3	25.0	240.1	208.4	1160.4	952.0	16.3	0.0614
15.3	30.0	250.3	218.8	1163.9	945.1	13.74	0.0728
20.3	35.0	259.3	227.9	1166.8	938.9	11.89	0.0841
25.3	40.0	267.3	236.1	1169.4	933.3	10.49	0.0953
30.3	45.0	274.5	243.4	1171.6	928.2	9.39	0.1065
40.3	55.0	287.1	256.3	1175.4	919.0	7.78	0.1285
50.3	65.0	298.0	267.5	1178.5	911.0	6.65	0.1503
60.3	75.0	307.6	277.4	1181.1	903.7	5.81	0.1721
70.3	85.0	316.3	286.3	1183.4	897.1	5.16	0.1937
80.3	95.0	324.1	294.5	1185.4	890.9	4.65	0.2151
91.3	106.0	332.0	302.7	1187.4	884.7	4.192	0.2336
101.3	116.0	338.7	309.6	1189.0	879.3	3.848	0.2599
125.3	140.0	353.1	324.6	1192.2	867.7	3.219	0.3107
151.3	166.0	366.5	338.7	1195.1	856.4	2.737	0.3654
175.3	190.0	377.6	350.4	1197.3	846.9	2.406	0.4157
200.3	215.0	388.0	361.4	1199.2	837.9	2.138	0.468
225.3	240.0	397.4	371.4	1200.9	829.5	1.924	0.520
255.3	270.0	407.9	382.5	1202.6	820.1	1.718	0.582

Areas of Circles—Advancing by Eighths

Diameter	0	⅛	¼	⅜	½	⅝	¾	⅞	Diameter
0	.0	.0122	.0490	.1104	.1963	.3068	.4417	.6013	0
1	.7854	.9940	1.227	1.484	1.767	2.073	2.405	2.761	1
2	3.141	3.546	3.976	4.430	4.908	5.411	5.939	6.491	2
3	7.068	7.669	8.295	8.946	9.621	10.32	11.04	11.97	3
4	12.56	13.36	14.18	15.03	15.90	16.80	17.72	18.66	4
5	19.63	20.62	21.64	22.69	23.75	24.85	25.96	27.10	5
6	28.27	29.46	30.67	31.91	33.18	34.47	35.78	37.12	6
7	38.48	39.87	41.28	42.71	44.17	45.66	47.17	48.70	7
8	50.26	51.84	53.45	55.08	56.74	58.62	60.13	61.86	8
9	63.61	65.39	67.20	69.02	70.88	72.55	74.66	76.58	9
10	78.54	80.51	82.51	84.54	86.59	88.65	90.76	92.88	10
11	95.03	97.20	99.40	101.6	103.8	106.1	108.4	110.7	11
12	113.0	115.4	117.8	120.2	122.7	125.1	127.6	130.1	12
13	132.7	135.2	137.8	140.5	143.1	145.8	148.4	151.2	13
14	153.9	156.6	159.4	162.2	165.1	167.9	170.8	173.7	14
15	176.7	179.6	182.6	185.6	188.6	191.7	194.8	197.9	15
16	201.0	204.2	207.3	210.5	213.8	217.0	220.3	223.6	16
17	226.9	230.3	233.7	237.1	240.5	243.9	247.4	250.9	17
18	254.4	258.0	261.5	265.1	268.8	272.4	276.1	279.8	18
19	283.5	287.2	291.0	294.8	298.6	302.4	306.2	310.2	19
20	314.1	318.1	322.0	326.0	330.0	334.1	338.1	342.2	20
21	346.3	350.4	354.6	358.8	363.0	367.2	371.5	375.8	21
22	380.1	384.4	388.8	393.2	397.6	402.0	406.4	410.9	22
23	415.4	420.0	424.5	429.1	433.7	438.3	443.0	447.6	23
24	452.3	457.1	461.8	466.6	471.4	476.2	481.1	485.9	24
25	490.8	495.7	500.7	505.7	510.7	515.7	520.7	525.8	25
26	530.9	536.0	541.1	546.3	551.5	556.7	562.0	567.2	26
27	572.5	577.8	583.2	588.5	593.9	599.3	604.8	610.2	27
28	615.7	621.2	626.7	632.3	637.9	643.5	649.1	654.8	28
29	660.5	666.2	671.9	677.7	683.4	689.2	695.1	700.9	29
30	706.8	712.7	718.6	724.6	730.6	736.6	742.6	748.7	30
31	754.8	760.9	767.0	773.1	779.3	785.5	791.7	798.0	31
32	804.2	810.5	816.9	823.3	829.6	836.0	842.4	848.8	32
33	855.3	861.8	868.3	874.8	881.4	888.0	894.6	901.3	33
34	907.9	914.6	921.3	928.1	934.8	941.6	948.4	955.3	34
35	962.1	969.0	975.9	982.8	989.8	996.8	1003.8	1010.8	35
36	1017.9	1025.0	1032.1	1039.2	1046.4	1053.5	1060.7	1068.0	36
37	1075.2	1082.5	1089.8	1097.1	1104.5	1111.8	1119.2	1126.7	37
38	1134.1	1141.6	1149.1	1156.6	1164.2	1171.7	1179.3	1186.9	38
39	1194.6	1202.3	1210.0	1217.7	1225.4	1233.2	1241.0	1248.8	39
40	1256.6	1264.5	1272.4	1280.3	1288.3	1296.2	1304.2	1312.2	40
41	1320.3	1328.3	1336.4	1344.5	1352.7	1360.8	1369.0	1377.2	41
42	1385.4	1393.7	1402.0	1410.3	1418.6	1427.0	1435.4	1443.8	42
43	1452.2	1460.7	1469.1	1477.6	1486.2	1494.7	1503.3	1511.9	43
44	1520.5	1529.2	1537.9	1546.6	1555.3	1564.0	1572.8	1581.6	44
45	1590.4	1599.3	1608.2	1617.0	1626.9	1643.9	1643.9	1652.9	45
46	1661.9	1671.0	1680.0	1689.1	1698.2	1707.4	1716.5	1725.7	46
47	1734.9	1744.2	1753.5	1762.7	1772.1	1781.4	1790.8	1800.1	47
48	1809.6	1819.0	1828.5	1837.9	1847.5	1857.0	1866.6	1876.1	48
49	1885.7	1895.4	1905.0	1914.7	1924.4	1934.2	1943.9	1953.7	49
50	1963.5	1973.3	1983.2	1993.1	2003.0	2012.9	2022.8	2032.8	50

Table for Converting Square Feet to Lineal Feet, For Different Size of Pipe

One square foot of radiating surface equals:

3.63 Lineal test	¾" Pipe
2.9 " "	1 " "
2.3 " "	1¼" "
2.01 " "	1½" "
1.608 " "	2 " "
1.329 " "	2½" "
1.090 " "	3 " "
0.955 " "	3½" "

Effect of Back Pressure on Steam Consumption

Steam Consumption:

0.848 Lineal test	4 " Pipe
0.763 " "	4½" "
0.685 " "	5 " "
0.576 " "	6 " "
0.501 " "	7 " "
0.442 " "	8 " "
0.397 " "	9 " "
0.355 " "	10 " "

American Blower

"Sirocco" TRADE MARK VENTILATING, HEATING, AIR CONDITIONING, DRYING, MECHANICAL DRAFT

MANUFACTURERS OF ALL TYPES OF AIR HANDLING EQUIPMENT SINCE 1881